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ABSTRACT

This paper reports the process by which Anne Arundel County Public Schools evaluated its mathematics program. The steps are outlined by which the evaluation was initiated, designed, implemented, and reported. The procedures developed to address and implement the evaluation findings and recommendations are described. The evaluation was initiated to evaluate a unified mathematics curriculum which had been implemented ten years earlier and to address questions about students' mathematics achievement which had been raised in response to a state-mandated functional mathematics test. Data were collected from a variety of sources to answer a set of questions about the mathematics curriculum; students' achievement, later success, and attitudes toward mathematics; and mathematics instruction. Although the evaluation focused on the mathematics curriculum, the model is applicable to evaluate other curricula. (JAZ)

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A Design for Evaluating and Reporting the Effectiveness of a School System
Developed Mathematics Curriculum

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(Presented at the American Educational Research Association (70th, San
Francisco, CA, April 16-20, 1986)

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Abstract

This paper reports the process by which a large, urban-suburban school system evaluated its mathematics program. The evaluation was initiated to evaluate a locally developed unified mathematics curriculum which had been implemented ten years earlier and to address questions about students' mathematics achievement which had been raised in response to a state-mandated functional mathematics test. Data were collected from a variety of sources to answer a set of questions about the mathematics curriculum; students' achievement, later success, and attitudes toward mathematics; and mathematics instruction. The model provides for the evaluation of curricula developed within a school system, is comprehensive, provides for both internal and external evaluators, and provides for the collection of new information and the aggregation of existing data. All decisions for program change remain with the specific curriculum staff and board of education, not with the evaluator. The value and importance of the model is that, while comprehensive, it is manageable by a small staff, uses standardized and locally developed instruments, produces a report of results which is both detailed yet understandable by a lay board of education, and fosters the use of evaluation results for ongoing program refinement and improvement.

A Design For Evaluating And Reporting
The Effectiveness Of A School System
Developed Mathematics Curriculum

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This paper reports the process by which a large, urban-suburban school system evaluated its mathematics program. The objectives of the paper are to outline and describe the steps by which the evaluation was initiated, designed, implemented, and reported and the procedures developed to address and implement the evaluation findings and recommendations. Although the evaluation focused on the mathematics curriculum, the model is applicable to evaluate other curricula.

The evaluation was initiated at the request of the central office administration and board of education in response to a number of specific questions which had been raised about the kindergarten through grade twelve unified mathematics program. This is a locally developed mathematics program which had been implemented in the county schools ten years earlier. The questions and ultimately a decision to evaluate the total curriculum, were raised in response to the results of a state-mandated functional mathematics test, a desire on the part of the staff to examine the mathematics curriculum and the success with which it had been implemented at the school and classroom levels over a ten year period, as well as to concerns about specific practices which had been introduced into the mathematics program, e.g., offering algebra I in grade seven and awarding vocational education students mathematics credit for the practical mathematics they used in learning their trades.

The evaluation was generated by specific questions about the mathematics program which were solicited from the superintendent of schools, board of education, central office staff, principals, and mathematics teachers. Prior to data collection, the questions were categorized into three categories: the mathematics curriculum (i.e., "Does the mathematics curriculum reflect current trends in curriculum development and current research in learning and instruction?" or "What is the best organization for high school unified mathematics and other elective courses?"); student performance in and attitudes toward mathematics (i.e., "How successful are students who enroll in algebra I as seventh graders?" or "How well prepared in mathematics are graduates for their employment or further study in mathematics?"); and mathematics instruction ("What are mathematics teachers' staff development interests and needs?" or "To what degree has the unified mathematics curriculum been implemented in the schools?").

Following the collection of and agreement upon which questions the evaluation was to address, a determination was made regarding what information was necessary to answer each question. It was

further determined whether the data necessary to answer the question currently existed or if it needed to be gathered. The evaluation design was based upon those procedures necessary to gather or aggregate the information necessary to answer the evaluation questions. Ultimately, the evaluation design provided for gathering information from five sources:

Mathematics Consultants. Consultants external to the system examined the curriculum, responded to a set of questions about the unified mathematics curriculum, and produced a set of recommendations about the curriculum and its implementation. The consultants were selected to represent a breadth of expertise in mathematics education, classroom experience, and mathematics curricula at the local, state, and national levels.

Students. Three samples of students were selected to be surveyed about their mathematics experiences in school as well as their attitudes toward, knowledge of, and later success in mathematics. The first was a sample of graduates over the previous five years; the second, a sample of students currently enrolled in grades nine through twelve; and the third, all students who had enrolled in algebra I as seventh graders during the first two years the course was offered countywide in grade seven.

Administrators, Counselors, and Mathematics Teachers. All school administrators, guidance counselors, and mathematics teachers responded to a series of questions about their inservice needs in mathematics instruction; the degree to which the mathematics program is implemented in their classrooms and schools; the ease or difficulty of teaching the curriculum; the degree to which the curriculum meets the variety of students' needs; instructional strategies and grouping techniques used in teaching mathematics; materials used to plan and deliver instruction; the availability of curriculum materials, textbooks, and equipment; and the effectiveness of the unified mathematics program.

Test Scores. Two random samples of eleventh grade students were tested on their knowledge of general mathematics. The first was a sample of the total eleventh grade enrollment and the second was a sample of eleventh grade students enrolled in vocational trade programs.

Existing Data. The final source of data relevant to the evaluation questions were those data which had been collected prior to the evaluation. These data included test results (scores from countywide testing gathered to meet state educational accountability mandates), course scheduling and grade reporting data (enrollment data for mathematics elective courses by grade and the distribution of final course grades for the previous school year), a sample of the cumulative records of graduates over a five year period, Personnel Office data (descriptive and

demographic data about the mathematics teachers, their certification, and the number retiring and leaving teaching for employment outside education), and Staff Development Office data (participation in inservice programs, workshops, and mathematics certification programs offered by the system).

The final report of the evaluation findings was organized to integrate and synthesize data from each of the above sources under the original questions which determined the evaluation design. This format was adopted to meet the needs of the variety of audiences that would receive it, such as the lay board of education as well as members of the mathematics staff, and still provide in one document both comprehensiveness and clarity. Readers of the report had access to either a summary of the entire evaluation or to specific questions of interest. Under each evaluation question, findings were keyed to each of the sixteen sources of data gathered to answer the questions. Finally, the evaluation findings were summarized; observations about trends and patterns were noted; and a set of recommendations from consultants, the staff, and students were presented.

A major component of the evaluation process was to foster the use of the evaluation report to effect changes in the mathematics program where necessary. The evaluation results were presented with the cooperation of the mathematics office to the board of education, meetings of principals, and at the faculty meetings of several schools. All recommendations for changes to the mathematics program were made by the mathematics office after studying the report and soliciting the reactions and of mathematics teachers, school principals, and students' and parents' groups. Three months after the final evaluation report was presented, the mathematics office proposed twelve changes to be made to the mathematics program. A copy of the final recommendations for program changes developed by the mathematics office will accompany the report of the evaluation findings.

This evaluation model provides for the evaluation of programs developed by individual school systems. The evaluation was comprehensive, provided for both internal and external evaluators, and provided for both the collection of new information and the aggregation of existing information to answer the questions. In addition it stipulated that the final decisions for program change remained with the specific curriculum office and board of education, not with the evaluator. The value and importance of the model is that it is manageable, can be implemented by a small staff, uses standardized and locally developed instruments, produces a report of results which is comprehensive yet understandable by a lay board of education, and fosters the use of evaluation results for ongoing program refinement and improvement.